

Notice of Allowability

Application No.

10/032,446

Examiner

James A. Thompson

Applicant(s)

YAMAMOTO, TOSHITSUGU

Art Unit

2625

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 10 May 2007.
2. ☒ The allowed claim(s) is/are 1,4-6,10 and 13-17.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.


Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.

THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☐ Information Disclosure Statements (PTO/SB/08), Paper No./Mail Date _____
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____


DAVID MOORE
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2800

James A. Thompson
Examiner
Technology Division 2625

DETAILED ACTION***Response to Arguments***

1. Applicant's arguments, see pages 7-11, filed 10 May 2007, with respect to the rejections under 35 USC §103(a) have been fully considered and are persuasive. The rejections under 35 USC §103(a) set forth in the previous office action, mailed 21 February 2007, have been withdrawn. Examiner agrees with Applicant that the present amendments to the claims overcome the previous prior art rejections. Further, Examiner has not discovered any additional prior art that either anticipates the claims or renders the claims obvious to one of ordinary skill in the art at the time of the invention. Accordingly, the present claims are considered allowable.

Allowable Subject Matter

2. **Claims 1, 4-6, 10 and 13-17 are allowed.**

The following is an examiner's statement of reasons for allowance:

Independent claim 1 recites subject matter which is neither found in Ishiguro (USPN 6,501,566), which was cited in said previous office action, or in Examiner's search of the prior art. Claim 1 recites that, when the input pixel represents a white pixel, a white pixel is output and the error memory is cleared, resulting in the error diffusion operation not being performed. This has the advantage of resetting the whole error diffusion process under such a condition. This is advantageous in the printing arts since certain artifacts, such as the well-known "salt-and-pepper" artifact, can be decreased or substantially eliminated since the error values do not carry over in the event of a full-on white pixel being input. An example of this reduction is shown in figures 22 and 23 of the present application. Figure 22 shows results of conventional error diffusion halftoning, while figure 23 shows results of the error diffusion halftoning recited in claim 1. While the result is not perfect, it is clearly superior and greatly mitigates the "salt-and-pepper" noise of the resultant image. By specifically and actively clearing the error memory when a white pixel is input and simply outputting the same white pixel, improved error diffusion results are obtained.

Examiner has found no prior art which either anticipates claim 1 or renders claim 1 obvious to one of ordinary skill in the art at the time of the invention. Many other types of modifications to the standard error diffusion technique have been developed. One is the adaptive modification of error diffusion weights, such as taught by Yamada (USPN 6,172,768 B1). Another modification operates by

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adaptively adjusting the threshold levels, and thus dynamically adjusting the resultant error values, as taught by Mantell (USPN 5,835,238). But, the particular method recited in claim 1, wherein the error memory is cleared and calculation of error diffusion suspended when a white pixel is input, is not found in the prior art. Thus, claim 1 is deemed allowable.

Claims 4 and 5 are deemed allowable due to their respective dependencies from claim 1.

Independent claim 6 differs from claim 1 in that the error memory is cleared and error diffusion is not performed when a *black* pixel is input. This also causes a black pixel to be output. For reasons similar to claim 1, claim 6 is also deemed allowable.

Independent claim 10 is the method performed by the apparatus of claim 1. Claim 10 is deemed allowable due to the same reasons applied to claim 1. Claims 13 and 14 are deemed allowable due to the respective dependencies from claim 10.

Independent claim 15 is an apparatus which combines the functions of both claim 1 and claim 6. If either a white or a black pixel is input, then the error memory is cleared and error diffusion is not calculated. Then, either a white or a black pixel (corresponding to the input) is output. Thus, for the reasons given for both claim 1 and claim 6, claim 15 is deemed allowable. Claims 16 and 17 are deemed allowable due to their respective dependencies from claim 15.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to James A. Thompson whose telephone number is 571-272-7441. The examiner can normally be reached on 8:30AM-5:00PM.

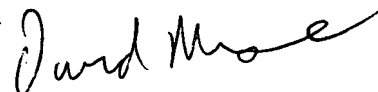
If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, David K. Moore can be reached on 571-272-7437. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

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JAT
25 July 2007



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